



TENNESSEE DEPARTMENT OF
EDUCATION
FIRST TO THE TOP

Large Animal Science

Primary Career Cluster:	Agriculture, Food and Natural Resources
Consultant:	Steven Gass, (615) 532-2847, Steven.Gass@tn.gov
Course Code(s):	6116
Prerequisite(s):	<i>Small Animal Science</i> (5958)
Credit:	1
Grade Level:	11
Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Agriculture courses.
Programs of Study and Sequence:	This is the third course in the <i>Veterinary and Animal Science</i> program of study.
Aligned Student Organization(s):	FFA: http://www.tnffa.org Allie Ellis, (615) 253-5207, Allie.Ellis@tn.gov
Coordinating Work-Based Learning:	All Agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program. In addition, Teachers are encouraged to use embedded WBL activities. For information, visit http://tn.gov/education/cte/work_based_learning.shtml .
Available Student Industry Certifications:	Beef Quality Assurance (BQA); Pork Quality Assurance (PQA)
Dual Credit or Dual Enrollment Opportunities:	There are no statewide dual credit/dual enrollment opportunities for this course. If interested in establishing a local opportunity, reach out to a local postsecondary institution.
Teacher Endorsement(s):	048, 150, 448
Required Teacher Certifications/Training:	None
Teacher Resources:	http://www.tn.gov/education/cte/AgricultureFoodNaturalResources.shtml

Course Description

Large Animal Science is an applied course in veterinary and animal science for students interested in learning more about becoming a veterinarian, vet tech, vet assistant, or pursuing a variety of scientific, health, or agriculture professions. This course covers anatomy and physiological systems of different groups of large animals, as well as careers, leadership, and history of the industry. Upon completion of this course, proficient students will be prepared for success in the level-four *Veterinary Science* course and further postsecondary training. Standards in this course are aligned with Tennessee State Standards for English Language Arts & Literacy in Technical Subjects, as well as Tennessee state standards in Anatomy and Physiology and National Agriculture, Food and Natural Resources Career Cluster Content Standards.*

Program of Study Application

This is the third course in the *Veterinary and Animal Sciences* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Agriculture, Food and Natural Resources website at

<http://www.tn.gov/education/cte/AgricultureFoodNaturalResources.shtml>.

Course Standards

History of Domestication

- 1) Synthesize research on the history of large animal domestication to produce an informative essay, including defining and applying industry-specific terminology to classify animals in the correct taxonomy. Justify the historical uses and roles of domesticated animals, and compare historical processes of large animal domestication. (TN Reading 1, 4, 9; TN Writing 2, 4, 9)

Economic, Occupational and Technological Implications

- 2) Determine the general economic impact of the large animal industry by investigating both recreational and business implications of large animal domestication through governmental and news publications. Develop a summary including both graphical representations and descriptive text to summarize findings. (TN Reading 1; TN Writing 7)
- 3) Explore and compare local and regional career opportunities in the large animal industry and evaluate labor data to predict the employment outlook. Describe in a written or visual representation the knowledge, skills, and abilities necessary for a diverse range of careers in large animal sciences citing specific textual evidence from local job postings and Tennessee labor data. (TN Reading 1, 2; TN Writing 2, 9)
- 4) Accurately maintain an activity recordkeeping system and apply proper financial recordkeeping skills as they relate to a large animal science supervised agricultural experience (SAE) program. Demonstrate the ability to summarize records and reports by completing SAE and related applications. (TN Reading 9; TN Writing 2, 9)
- 5) Examine specific technologies that have evolved within the large animal industry (such as, but not limited to equipment, housing, procedures, and healthcare) and evaluate the economic and societal implications of each. (TN Reading 1, 2, 4)

Personal and Occupational Health and Safety

- 6) Identify, research, and determine the significance of zoonotic diseases associated with large animals. Compare and contrast findings from multiple credible sources relating to a specific disease (including student's own experience or laboratory experiment, case studies, and scholarly journals). Justify the use of different methods of infection control in the prevention or management of a zoonotic disease and evaluate the efficacy of existing large animal biosecurity measures. (TN Reading 1, 5, 9)

- 7) Correctly identify and summarize laws and regulations that pertain to large animal health and safety in an explanatory text, citing specific textual evidence from state and national legislation. Describe health requirements and necessary documentation for large animal transportation and change of ownership. (TN Reading 1, 9; TN Writing 2, 4)
- 8) Review common laboratory safety procedures for tool and equipment operation in the large animal laboratories, including but not limited to accident prevention and control procedures. Demonstrate the ability to follow safety and operational procedures in a lab setting and complete a safety test with 100 percent accuracy. (TN Reading 3)
- 9) Demonstrate in a live setting or in a presentation the ability to follow procedures precisely, attending to special cases or exceptions noted in appropriate materials, and apply them to the following areas:
 - a. Animal restraint and handling
 - b. Techniques for transportation
 - c. Appropriate use of chemicals (such as pesticide, fungicide, disinfectants)Differentiate between effective methods for handling large animals and methods proven to be less effective. (TN Reading 3)

Animal Ethics

- 10) Identify the fundamental philosophies related to animal rights and animal welfare. Compare the impact of specific persons, organizations, and legislation related to animal rights and welfare of large animals. (TN Reading 1, 9; TN Writing 9)
- 11) Investigate current large animal issues by analyzing an author's purpose and assessing the extent to which the reasoning and evidence in a specific text support the author's claim. Debate specific issues by forming and supporting claims and counterclaims with specific data and evidence. Issues related to animal rights and animal welfare may include, but are not limited to:
 - a. Abuse and/or neglect
 - b. Environmental implications
 - c. Consumer product implications
 - d. Exhibiting and showing
 - e. Global issues in large animal ethics and their relation to local problems(TN Reading 6, 8, 9; TN Writing 1)

Nutrition and Digestive Systems

- 12) Create a visual representation to differentiate between ruminant and non-ruminant animals and monogastric and polygastric animals, comparing and contrasting their anatomical and physiological differences. Explain the relationships of digestive system types to the ability of an animal to digest and absorb different classes of feed. (TN Reading 7, TN A&P 5)
- 13) Using information from scholarly journals or Tennessee Extension Service, research nutrient requirements of the diets of large animals and organize these into various nutrient groups. Differentiate between roughages and concentrates and their nutritional values. (TN Reading 7; TN Writing 9)

- 14) Interpret feed labeling and evaluate factors such as life stage and activity level to determine the nutritional needs and then recommend balance rations for each large animal species, justifying recommendations with evidence from the text. (TN Reading 1, 3, 7; TN Writing 1, 4, 9)
- 15) Diagnose the symptoms of nutritional diseases relevant to large animals and recommend the appropriate control procedures, citing specific evidence to support recommendations. (TN Reading 7; TN Writing 1, 7, 8, 9)

Genetics and Reproduction

- 16) Research and develop illustrative models of the major components of male and female reproductive systems in large animals and prepare a short narrative to distinguish the function of reproductive organs, endocrine glands, and hormones. Produce an explanatory essay comparing the physiological changes that occur across different species during reproductive phases, including the estrus cycle, fertilization, gestation, parturition and lactation. (TN Reading 7, 9; TN Writing 2, 4; TN A&P 6)
- 17) Using graphical representations and descriptive text, explain how the roles of heritability, selection intensity, generation interval, and other advanced principles of genetics (such as DNA testing for disorders) apply to predict gene and trait transfer in large animal species. Principles include but are not limited to:
 - a. Economically important traits in production animals (i.e. artificial reproduction methods)
 - b. Interpretation and utilization of animal performance records (i.e. Expected Progeny Difference [EPD])
 - c. Hybrid vigor(TN Reading 1, 4, 7, 9; TN Writing 2, 4, 7, 9; TN Biology I 4; TN Biology II 4)

Fundamental Care and Health of Horses

- 18) Synthesize research on the historical importance of horses, noting major economic, social, and medical advances impacting domestication. Produce an informational essay or model (such as a timeline, graphical illustration, or presentation) that formulates comparisons among different horse breeds and hybrids. Demonstrate conceptual understanding and technical skill in current practices of comprehensive health care and management for the following:
 - a. Design appropriate facilities based on assessment of needs and present plans in a visual format
 - b. Compare appropriate owner/handler responses to behaviors and instincts to ensure safety of both handler and animal in a variety of situations
 - c. Distinguish between clinical signs of proper health and poor health, justifying explanations with data and evidence (TN Reading 1)
 - d. Using quantitative reasoning and appropriate units, calculate appropriate rations based on animal characteristics (age, weight, breed, activity level) and nutritional needs by creating systems of equations that describe numerical relationships
 - e. Illustrate the reproductive cycle graphically, and summarize available breeding methods and current reproductive technologies (TN Reading 2, 7)

- f. Research common diseases and parasites and their effects on the health of horses, and draw evidence from the most recent medical literature to recommend the best prevention or control measures.

(TN Reading 1, 2, 3, 7, 8, 9; TN Writing 2, 7, 8, 9; TN Math N-Q, A-CED)

Fundamental Care and Health of Cattle

- 19) Synthesize research on the historical importance of cattle, noting major economic, social, and medical advances impacting domestication. Produce an informational essay or model (such as a timeline, graphical illustration, or presentation) that formulates comparisons among different cattle breeds. Demonstrate conceptual understanding and technical skill in current practices of comprehensive health care and management for the following:
- a. Design appropriate facilities based on assessment of needs and present plans in a visual format
 - b. Compare appropriate owner/handler responses to behaviors and instincts to ensure safety of both handler and animal in a variety of situations
 - c. Distinguish between clinical signs of proper health and poor health, justifying explanations with data and evidence
 - d. Using quantitative reasoning and appropriate units, calculate rations based on animal characteristics (age, weight, breed, activity level) and nutritional needs by creating systems of equations that describe numerical relationships
 - e. Illustrate the reproductive cycle graphically, summarize available breeding method, and current reproductive technologies
 - f. Research common diseases and parasites and their effects on the health of cattle, and draw evidence from the most recent medical literature to recommend the best prevention or control measures
 - g. Evaluate the economic implications of livestock management practices (such as dehorning)

(TN Reading 1, 2, 3, 7, 8, 9; TN Writing 2, 7, 8, 9; TN Math N-Q, A-CED)

Fundamental Care and Health of Sheep and Goats

- 20) Synthesize research on the historical importance of sheep and goats, noting major economic, social, and medical advances impacting domestication. Produce an informational essay or model (such as a timeline, graphical illustration, or presentation) that formulates comparisons among different sheep and goat breeds. Demonstrate conceptual understanding and technical skill in current practices of comprehensive health care and management for the following:
- a. Design appropriate facilities based on assessment of needs and present plans in a visual format
 - b. Compare appropriate owner/handler responses to behaviors and instincts to ensure safety of both handler and animal in a variety of situations
 - c. Distinguish between clinical signs of proper health and poor health, justifying explanations with data and evidence
 - d. Using quantitative reasoning and appropriate units, calculate appropriate rations based on animal characteristics (age, weight, breed, activity level) and nutritional needs by creating systems of equations that describe numerical relationships
 - e. Illustrate the reproductive cycle graphically, and summarize available breeding methods and current reproductive technologies

- f. Research common diseases and parasites and their effects on the health of sheep and goats, and draw evidence from the most recent medical literature to recommend the best prevention or control measures
- (TN Reading 1, 2, 3, 7, 8, 9; TN Writing 2, 7, 8, 9; TN Math N-Q, A-CED)

Fundamental Care and Health of Swine

- 21) Synthesize research on the historical importance of swine, noting major economic, social, and medical advances impacting domestication. Produce an informational essay or model (such as a timeline, graphical illustration, or presentation) that formulates comparisons among different swine breeds. Demonstrate conceptual understanding and technical skill in current practices of comprehensive health care and management for the following:
- a. Design appropriate facilities based on assessment of needs and present plans in a visual format
 - b. Compare appropriate owner/handler responses to behaviors and instincts to ensure safety of both handler and animal in a variety of situations
 - c. Distinguish between clinical signs of proper health and poor health, justifying explanations with data and evidence
 - d. Using quantitative reasoning and appropriate units, calculate appropriate rations based on animal characteristics (age, weight, breed, activity level) and nutritional needs by creating systems of equations that describe numerical relationships
 - e. Illustrate the reproductive cycle graphically, and summarize available breeding methods and current reproductive technologies
 - f. Research common diseases and parasites and their effects on the health of swine, and draw evidence from the most recent medical literature to recommend the best prevention or control measures
- (TN Reading 1, 2, 3, 7, 8, 9; TN Writing 2, 7, 8, 9; TN Math N-Q, A-CED)

Fundamental Care and Health of Poultry

- 22) Synthesize research on the historical importance of poultry, noting major economic, social, and medical advances impacting domestication. Produce an informational essay or model (such as a timeline, graphical illustration, or presentation) that formulates comparisons among different poultry breeds. Demonstrate conceptual understanding and technical skill in current practices of comprehensive health care and management for the following:
- a. Design appropriate facilities based on assessment of needs and present plans in a visual format
 - b. Compare appropriate owner/handler responses to behaviors and instincts to ensure safety of both handler and bird in a variety of situations
 - c. Distinguish between clinical signs of proper health and poor health, justifying explanations with data and evidence
 - d. Using quantitative reasoning and appropriate units, calculate appropriate rations based on bird characteristics (age, weight, breed, activity level) and nutritional needs by creating systems of equations that describe numerical relationships
 - e. Illustrate the reproductive cycle graphically, and summarize available breeding methods and current reproductive technologies

- f. Research common diseases and parasites and their effects on the health of poultry, and draw evidence from the most recent medical literature to recommend the best prevention or control measures
(TN Reading 1, 2, 3, 7, 8, 9; TN Writing 2, 7, 8, 9; TN Math N-Q, A-CED)

Standards Alignment Notes

*References to other standards include:

- TN Reading: [Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects](#); Reading Standards for Literacy in Science and Technical Subjects 6-12; Grades 11-12 Students (page 62).
 - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standard 10 at the conclusion of the course.
- TN Writing: [Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects](#); Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12; Grades 11-12 Students (pages 64-66).
 - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 3, 5, 6, and 10 at the conclusion of the course.
- TN Math: [Tennessee State Standards for Mathematics](#); Math Standards for High School: Number and Quantity, Algebra.
 - Note: The standards in this course are not meant to teach mathematical concepts. However, the concepts referenced above may provide teachers with opportunities to collaborate with mathematics educators to design project based activities or collaborate on lesson planning. Students who are engaging in activities listed above should be able to demonstrate quantitative and algebraic reasoning as applied to specific technical concepts. In addition students will have the opportunity to practice the habits of mind as described in the eight Standards for Mathematical Practice.
- SAE: [Supervised Agricultural Experience](#): All Agriculture students are encouraged to participate in a Supervised Agricultural Experience program to practice and demonstrate the knowledge and skills learned in their agriculture courses.
- TN A&P: Tennessee Science: [Anatomy and Physiology](#) standards 5 and 6 may provide additional insight and activities for educators.
- AFNR: [National Agriculture, Food and Natural Resources \(AFNR\) Career Cluster Content Standards](#): Students engaged in activities outlined above should be able to demonstrate fluency in Standards AS and CS at the conclusion of the course.
- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
 - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.